

**Northern State University
New Residence Hall
Facility Design Plan
March 2016**

NSU is requesting the Building Committee's approval of the Facility Design Plan for the new residence hall. The Board of Regents approved the Preliminary Facility Statement in December of 2014 and the Facility Program Plan in December of 2015.

The Design-Build method of construction is being used for this project. Quest Construction was selected by the Building Committee to build this residence hall. The building has been designed by CO-OP Architects in conjunction with Quest Construction and their team of engineers. The design has been reviewed by NSU administrators, the Director of Residence Life and the Director of Facilities. A meeting was also held with hall directors and residence hall assistants. The group provided valuable feedback and several of their suggestions have been incorporated into the design.

This three-story residence hall will be built on a vacant lot on the northwest corner of campus. The exterior finishes of masonry, EFIS and metal panels will complement existing campus buildings. The facility will include 42,895 square feet and a total of 144 beds made up of ten 2-person suites, fourteen 4-person suites and seventeen 4-person semi-suites.

The 4-person suites include two bedrooms that will each be furnished with two beds, two dressers, two desks and two chairs. They also include a vanity with two sinks as well as separate space for the shower and toilet to maximize privacy. The 2-person suites will include one furnished bedroom that accommodates both beds and a bathroom with the same basic layout as the 4-person suite except the vanity will have just one sink. Each of the suites also includes a small living area. The bedrooms and living areas will be carpeted while the flooring in the rest of the suite will be tile.

The semi-suites include two furnished bedrooms that will each accommodate two students. The bathrooms will include a vanity with two sinks and separate, private spaces for both the shower and the toilet. The bedrooms will be carpeted and tile flooring will be installed in the remaining area of the semi-suites. The semi-suites will be on the south wing of each floor. These rooms do not contain living space within the suite, rather there are quiet coves located just outside the rooms. The coves will be furnished with booths and tables. Whiteboards will be installed on the walls making these spaces a nice areas for students to gather and work on group projects.

The facility will be fully air conditioned and wireless network access will be provided throughout the building. There will be an office with a reception area on the main floor along with an apartment for the hall director. There will be a common area with a kitchen as well as a meeting/study room and laundry facilities on each floor. The building will have an elevator and a recycling room. It will be ADA compliant and be built to meet LEED Silver requirements.

A. Architectural, mechanical and electrical schematic design plan

Schematic design plans including floor plans, site plans, exterior views and room layouts are attached to this document.

B. Changes from Facility Program Plan

There have been no major changes to the design included in the Facility Program Plan. The number of beds was originally projected at 125-150. As described above, the plan now includes 144 beds.

C. Impact to existing building or campus-wide heating/cooling/electrical systems

HVAC SYSTEM:

The HVAC system shall consist of the following:

Compact VRF Technology Coupled with Water Source Heat Pumps

Variable Refrigerant Flow technology to be utilized with heat recovery refrigeration piping to zone fan coils coupled with water source heat pumps. Energy efficient innovative VRF system technology delivers exceptional comfort with low energy consumption only using what you need, when you need it. The heat recovery VRF will transfer heat between fan coil unit zones while the water loop will transfer heat from one water source heat pump to be used by another.

Individual Suites

Each individual suite will have a compact fan coil located in a soffit within the suite. This combination heating-and-cooling fan coil unit allows superior comfort control for each individual suite. With the VRF technology, this heat recovery system permits synchronous heating & cooling in different suites at the same time. Soffits within the suites will conceal the supply ductwork and shall be utilized as a return air plenum. Fresh air will be ducted into the soffit at each suite fan coil and pulled into the return thus mixing with return air and distributed throughout the suite.

Common Areas

The common areas will utilize the same system that is used for the individual suites. The quantity and type of fan coil units used will be selected based on how the spaces are utilized to maximize the system efficiency and comfort control throughout the common areas. Again, fresh air will be mixed with the return air into the fan coil units and distributed throughout the common areas to maximize indoor air quality.

Temperature Controls

The temperature control system shall be an extension of the existing DDC control system. All equipment shall be controlled and monitored by the existing color graphic operator's workstation for Owner's designated personnel to change schedules and set points.

Hydronic System

The hydronic piping will consist of an uninsulated, two-pipe hydronic water loop that will use circulating pumps to circulate water to all of the VRF heat pumps. This will allow the heat pumps to extract heat from the water loop when they are in heating mode and reject heat to the water loop when they are in cooling mode. As previously mentioned, the water loop will thus transfer heat from one heat pump to another within the building. In order to minimize the amount of hydronic piping, the intent is to locate all of the VRF heat pumps on one floor with refrigerant piping connecting the heat pump to all of the individual fan coil units that it serves.

Heat Injection & Heat Rejection

Heat will only be injected or rejected from the water loop as needed to maintain the water loop temperature within a range to optimize the operating efficiency of the VRF heat pumps. If the water loop temperature drops below the range minimum, heat will be injected using high efficiency, natural gas fired boilers. If the water loop temperature rises above the range maximum, heat will be rejected using a closed circuit, fluid cooler.

Ventilation Systems

The ventilation system will utilize Energy Recovery units coupled with VRF Dedicated Outdoor Air fan coil units to pre-condition the outside air before it is introduced into the building. The energy recovery units will transfer energy from the exhaust air stream to the outside air before it is supplied to the VRF dedicated outdoor air fan coil units which will either heat or cool & dehumidify the air before distributing it within the building. The ventilation system will be sized to meet the requirements for the increased ventilation LEED credit.

PLUMBING SYSTEM:

The plumbing system shall consist of the following:

Plumbing Fixtures

Plumbing fixtures to be high efficiency low water consumption fixtures to meet the requirements for the Water Use Reduction LEED credits. Fiberglass showers are planned in all suites. Exterior hydrants to be located at all exterior doors of first floor.

Domestic Water Piping & Insulation

To prevent pitting, scaling, or corrosion aboveground domestic cold, hot, and recirculating hot water piping & fittings shall be Uponor Pex A with a twenty-five year warranty. The exception will be all piping with in the mechanical room at the water meter fit and domestic hot water system will be Type L copper. All mains & branch piping shall be insulated with fiberglass with vapor barrier.

Domestic Hot Water System

Natural gas fired, high efficiency domestic hot water heaters will be utilized to provide domestic hot water for the building. A domestic hot water recirculation system will be used to ensure that the building occupants don't have to wait for hot water.

Sanitary Waste/Venting

All sanitary waste and venting shall be PVC piping and cast iron when within return air plenums.

Natural Gas Piping

All natural gas piping shall be schedule 40 black pipe with isolation valves and pressure reducing valves as necessary serving high efficiency hot water boilers & water heaters.

Storm Drainage

All storm drainage shall be PVC piping encased in insulation. Base bid includes primary roof drains to be provided for all flat roof areas piped down to first floor & terminating at downspout nozzles with an add alternate to pipe below grade to the city storm sewer. Flat roof areas to have overflow roof drainage from overflow scuppers.

Condensate Drainage

All condensate drain piping shall be PVC piping encased in insulation.

FIRE SPRINKLER SYSTEM:

A complete fire sprinkler system will be installed meeting NFPA, local codes, & the Fire Marshal. The system shall consist of a dedicated 6" fire protection water service located in the mechanical room with zoning installed per floor. The fire sprinkler riser within the mechanical room shall be iron pipe & fittings. CPVC piping concealed within the truss space shall be used for the majority of the facility. All piping to be rated for fire sprinkler installation. Flush concealed heads shall be used throughout the facility.

ELECTRICAL SYSTEMS

LIGHTING SYSTEM:

Lighting within the suites shall be LED fixtures. The bedroom fixtures will be controlled by vacancy sensors so that if the occupant leaves the space without turning off the fixtures, the lighting will turn off automatically after a set time period. Occupancy sensors will not be used in dorm rooms so that when an occupant enters the space they may choose to turn the lighting on, or leave off, based on ambient lighting.

Lighting in the hallways and common areas shall be LED fixtures. Common area lighting will be controlled by time clock allowing the fixtures to be on during the day and dimmed during evening hours, or on a schedule determined by the end user.

Exterior lighting shall be LED fixtures. Nighttime friendly fixtures will be utilized to help mitigate light pollution. For student/faculty safety any pathway lighting shall be operated by photocell control, on at dusk, off at dawn.

FIRE ALARM SYSTEM / LIFE SAFETY SYSTEMS:

The fire alarm system shall be installed to meet the present code requirements. A fully addressable system will be used. Exit and emergency lighting will be placed according to life safety codes.

DATA / PHONE SYSTEM:

The data system will be installed by a BICSI certified installer. CAT6 cabling will be used throughout the building. Data network racks with both vertical and horizontal cable management will be utilized. The data and phone systems will be connected to the campus system using fiber optic cable.

SECURITY SYSTEM:

The security system shall consist of cameras to monitor the building entrances, lobbies and common areas. Electronic card access will be provided at the main entrances vestibules. The security system will be compatible and connected to existing campus security.

POWER SYSTEM:

A transformer will be placed to provide 120/208V three phase power to the main electrical service in the new building. All electrical devices (switches, outlets) will be commercial grade. All wiring will be in accordance with the National Electrical Code and the South Dakota State Electrical Commission Wiring Bulletin.

D. Total construction cost estimates

The cost estimate from the Facility Program Plan has increased slightly. Soil tests show that additional site work will be required due to the makeup of the soil.

Project Costs:

| | |
|---|---------------------------|
| Design-Build Firm Cost (A/E & Construction) | \$6,350,000 |
| Furnishings | 351,000 |
| Contingency | 338,250 |
| Commissioning | 100,000 |
| State Engineer Fee | 70,750 |
| Testing | 40,000 |
| Site Work | 100,000 |
| Total Project Cost | <u><u>\$7,350,000</u></u> |

Funding Sources:

| | |
|-------------------------|----------------------------|
| Bond Proceeds | \$ 7,000,000 |
| Institutional M&R Funds | 350,000 |
| | <u><u>\$ 7,350,000</u></u> |

E. Changes from the cost estimates for operational or M&R expenses

At this time, there are no significant changes to the operational or M&R expenses from those provided in the facility program plan.

F. Timeline

Construction will begin in May of 2016. The facility is scheduled to be completed no later than July 17, 2017.



WEST ELEVATION

1/8" = 1'-0"



SOUTH ELEVATION

1/8" = 1'-0"



EAST ELEVATION

1/8" = 1'-0"



SOUTH COURTYARD ELEVATION

1/8" = 1'-0"



NORTH COURTYARD ELEVATION

1/8" = 1'-0"



NORTH ELEVATION

1/8" = 1'-0"

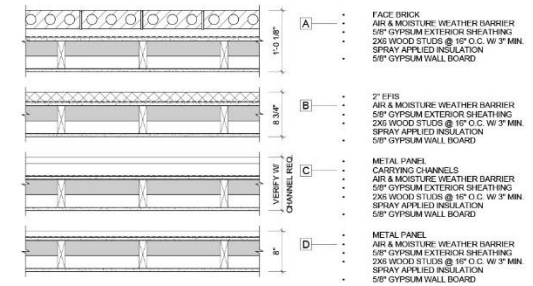


NOTE: RENDERINGS ARE FOR REPRESENTATION ONLY
AND ARE NOT TO BE USED FOR CONSTRUCTION

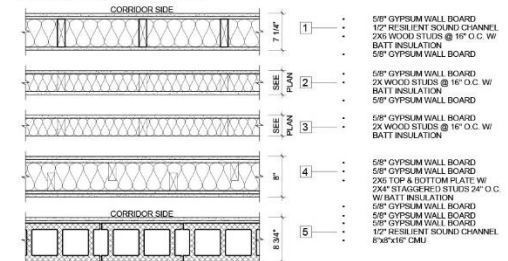
First Floor



EXTERIOR WALL TYPES



INTERIOR WALL TYPES



Second Floor



